



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/997,650	11/28/2001	Julia C. Duncan	DUNCAN 3-10-40	7404
27964	7590	06/28/2004	EXAMINER	
HITT GAINES P.C. P.O. BOX 832570 RICHARDSON, TX 75083			HOGANS, DAVID L	
			ART UNIT	PAPER NUMBER
			2813	

DATE MAILED: 06/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/997,650	Applicant(s) DUNCAN ET AL.	
	Examiner David L. Hogans	Art Unit 2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 April 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 9-12 and 15-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 9-12 and 15-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This Office Action is in response to the Remarks filed on April 1, 2004.

Status of Claims

Claims 9-12 and 15-17 are pending. Claims 1-8, 13, 14 and 18-20 have been cancelled.

Claim Objections

1. Claims 9-12 and 15-17 are objected to because of the following informalities: Claim 9 refers to a "mole weight percent". The Examiner is unaware of the term "mole weight percent" and what it means. The Examiner is familiar with the terms "weight percent" and "mole percent" but not "mole weight percent". A search for "mole weight percent" on www.google.com and www.yahoo.com did not produce any hits discussing the term. Additionally, Chemical Principles (Sixth Edition) to Masterton et al., an introductory chemistry textbook, teaches the principles of "weight percent" and "mole percent" but not "mole weight percent". Appropriate correction is required.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 9, 10 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by WO 00/57446 to Jones et al.

In reference to Claim 9, Jones et al. teaches:

- forming a semiconductor substrate (100) made of silicon (See page 6 lines 3-4)
- forming an active region (300; i.e. - a light emitting diode) over the semiconductor substrate (See Figure 2 and pages 6-8 lines 03-13; furthermore noting that an active region is any region that introduces gain or has a directional function)
- forming an indium doped dielectric layer (410) over the semiconductor substrate with an indium concentration ranging from 1 mol weight percent to 15 mol weight percent (See page 6 lines 12-20 and Figure 2)

In reference to Claim 10, Jones et al. teaches:

- forming an indium doped interlevel dielectric (410) (See Figure 2)

In reference to Claim 15, Jones et al. teaches:

- forming an indium doped dielectric layer (410) via a chemical vapor deposition process (i.e. – co-evaporation) (See page 7 lines 15-17)

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over WO 00/57446 to Jones et al.

Incorporating all arguments of Claim 9 and noting that Jones et al. discloses the claimed invention except for forming an indium doped silicon dioxide layer (Examiner notes that Jones et al. forms an indium doped silicon monoxide layer at page 6 lines 12-20). It would have been obvious to one having ordinary skill in the art at the time the invention was made to make an indium doped silicon dioxide layer, since it has been held to be within the general skill of a worker in the art to select a known material based on its suitability for its intended use. *In re Leshin*, 125 USPQ 416 (CCPA 1960)

Furthermore, the specification contains no disclosure of either the critical nature of the claimed process steps or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen process steps or upon another variable recited in a claim, the Applicant must show that the chosen process steps are critical. *In re Woodruff*, 919 F.2d 1575, 1578 (Fed. Cir. 1990)

2. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over WO 00/57446 to Jones et al.

Incorporating all arguments of Claim 9 and noting that Jones et al. discloses the claimed invention except for forming the indium doped dielectric layer to a thickness ranging from about 400 to 1200 nm (Examiner notes that Jones et al. forms an indium doped dielectric layer to a thickness of 50 nm at page 6 line 12). It would have been obvious to one having ordinary skill in the art at the time the invention was made to form the indium doped dielectric layer to a thickness of 400 to 1200 nm, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233 (CCPA 1955)

Furthermore, the specification contains no disclosure of either the critical nature of the claimed process steps or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen process steps or upon another variable recited in a claim, the Applicant must show that the chosen process steps are critical. *In re Woodruff*, 919 F.2d 1575, 1578 (Fed. Cir. 1990)

3. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over WO 00/57446 to Jones et al. in view of Publication No. JP2001-195789 to Kyo et al.

Incorporating all arguments of Claim 9 and noting that Jones et al. fails to explicitly teach an indium doped dielectric layer using a PVD process employing a target that comprises silicon dioxide and indium.

However, JP2001-195789 to Kyo et al., in column 2 lines 10-20, teaches forming an indium doped oxide layer via a PVD process with a target comprised by silicon dioxide, indium and chalcogen treated zinc. Further, JP2001-195789 teaches that the indium doped silicon dioxide protective film is formed without cracks, thereby increasing production efficiency.

It would have been obvious to one of ordinary skill in the art to modify Jones et al. by incorporating a PVD process with a target comprised by silicon dioxide, indium and chalcogen treated zinc, as taught by JP2001-195789, to form an indium doped silicon dioxide protective film without cracks, and, thereby increase production efficiency.

4. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over WO 00/57446 to Jones et al. in view of 5,397,920 to Tran.

Incorporating all arguments of Claim 9 and noting that Jones et al. fails to explicitly teach a pressure ranging from 4 to 8 mtorr, a radio frequency ranging from 50 to 550 watts and a gas flow rate ranging from 10 to 35 sccm when forming an indium doped dielectric layer.

However, Tran, in column 6 lines 34-49 and column 7 lines 29-32 and lines 51-57, teaches forming an indium doped oxide layer via a pressure of 7 mtorr, a radio frequency of 300 watts and a gas flow rate of 30 sccm. Further, Tran teaches that these process limitations give a film deposition rate of 1 angstrom per second. (See column 7 lines 53-57) Furthermore, Tran's use of such processing conditions shows the formation of an oxide layer to be functional.

It would have been obvious to one of ordinary skill in the art to modify Jones et al. by incorporating a pressure of 7 mtorr, a radio frequency of 300 watts and a gas flow rate of 30 sccm to form an indium doped oxide, as taught by Tran, to form the above film at a deposition rate of 1 angstrom per second. Furthermore, Tran's use of such processing conditions shows the formation of an oxide layer to be functional.

Response to Arguments

5. Applicant's arguments filed April 1, 2004, have been fully considered but they are not persuasive.

***Rejection of Claims 9, 10 and 15 under 35 U.S.C. §102(b) via WO 00/57446
to Jones et al.***

Initially the Applicant proffers that WO 00/57446 to Jones et al. (hereinafter Jones) fails to teach all the limitations of Claim 9. Specifically, the Applicant proposes that Jones fails to teach "forming an indium doped dielectric layer over at least a portion of an active region, wherein the indium doped dielectric layer has an indium

concentration ranging from about 1 mole weight percent to about 15 mole weight percent.” In support of this premise, the Applicant offers the following:

“... Jones only teaches that its layer of doped dielectric material 410 is doped to include between about 5 and 50 percent of conducting material, and not an indium concentration ranging from about 1 mole weight percent to about 15 mole weight percent. Mole weight percent and standard percent are two totally different measurements. Something that has between 5 and 50 weight percent of a conducting material does not necessarily have from 5 mole weight percent to 50 mole weight percent of the conducting material.”

Conventionally, the chemical arts either refers to “mole percent” or “weight percent”, and not “mole weight percent”. Therefore, it is presumed that the Applicant either means “mole percent” or “weight percent”, when they refer to “mole weight percent”.

Accordingly, whether Jones teaches a “weight percent” or a “mole percent” it falls within Applicant’s claim language. For instance if Jones teaches a “weight percent” then a SiO layer doped with 5 grams of Indium contains 1.97 mole percent of Indium and a SiO layer doped with 50 grams of Indium contains 27.7 mole percent of Indium. Assuming *arguendo* that Jones teaches a “mole percent” then a SiO layer doped with 5 mole percent of Indium contains 12.07 weight percent of Indium and a SiO layer doped with 50 mole percent of Indium contains 72.3 weight percent of Indium. Since under either scenario, Jones teaches ranges of Indium doping that fall with Applicant’s claimed ranges, Jones anticipates Claim 9. “[W]hen, as by a recitation of ranges or otherwise, a claim covers several compositions, the claim is ‘anticipated’ if one of them is in the prior

art.” *Titanium Metals Corp. v. Banner*, 778 F.2d 775 (Fed. Cir. 1985) (See MPEP 2131.03)

Secondly, Applicant argues that “Jones at page 7, lines 25 thru 30 discloses that ‘the doped dielectric material 410 is preferably formed by co-evaporating a thin layer (approximately 5 nm) of LiF or SiO with 30 wt% In or Sn through a shadow mask...” The 30 mole weight percent of indium required by Jones is outside of the range claimed in independent Claim 9.” (emphasis added) The Examiner notes that the cited section of Jones is to a preferred embodiment, which in no way diminishes the fact that Jones on page 6 discloses a dielectric formed over an active area with Indium doping ranging between 1 and 15 “mole weight percent” (i.e. – teaches all the elements of Claim 9). Additionally, it is of note that the Applicant equates “weight percent” with “mole weight percent”, on page 3 lines 6-8 of Applicant’s Remarks, (noting the underlined sections directly above) and on page 3 lines 2-3 of Applicant’s Remarks, Applicant argues: “Something that has between 5 and 50 weight percent of a conducting material does not necessarily have from 5 mole weight percent to 50 mole weight percent of the conducting material.” As these two statements are contrary, the Examiner is uncertain as to what “mole weight percent” means.

Rejection of Claims 11 and 12 under 35 U.S.C. §103 via WO 00/57446 to Jones et al.

The Applicant proffers that Jones teaches away from the present invention because, in a preferred embodiment, Jones teaches forming a SiO layer with 30 wt% In or Sn. The Examiner assumes that the Applicant is referring to *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540 (Fed. Cir. 1983). Here the "Claims were directed to a process of producing a porous article by expanding shaped, unsintered, highly crystalline poly(tetrafluoroethylene) (PTFE) by stretching said PTFE at a 10% per second rate to more than five times the original length. The prior art teachings with regard to unsintered PTFE indicated the material does not respond to conventional plastics processing, and the material should be stretched slowly. A reference teaching rapid stretching of conventional plastic polypropylene with reduced crystallinity combined with a reference teaching stretching unsintered PTFE would not suggest rapid stretching of highly crystalline PTFE, in light of the disclosures in the art that teach away from the invention, (i.e., that the conventional polypropylene should have reduced crystallinity before stretching, and that PTFE should be stretched slowly)." See MPEP 2141.02 In light of the fact that the particular facts of *W.L. Gore & Associates, Inc. v. Garlock, Inc.* do not apply here and the fact that Jones does teach all the limitations of Claim 9 (noting page 6 lines 12-27), the Applicant's argument of teaching away is without moment. Additionally, *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, implies that a teaching away states that a particular condition would not work (i.e. – an indium doped layer between 1 and 15 "mole weight percent" would not work). Jones does no such thing. Jones merely suggests, in a preferred embodiment, that a SiO layer can be doped with 30 wt% In.; bearing in mind that Jones also teaches that SiO can be doped

Art Unit: 2813

with between 5 and 50 percent conducting material (i.e. – Indium). Finally, the Examiner notes that SiO doped with 30 weight percent Indium constitutes 14.1 mole percent Indium.

Rejection of Claim 16 under 35 U.S.C. §103) via WO 00/57446 to Jones et al.

The Applicant argues that Jones and Kyo fail to teach 1 to 15 “mole weight percent” indium doping of a dielectric. Additionally, the Applicant argues that Jones teaches away from 1 to 15 “mole weight percent” indium doping of a dielectric. As these arguments were presented above, the Examiner refers Applicant to the above applicable responses. Finally, the Examiner notes that Kyo need not teach 1 to 15 “mole weight percent” indium doping of a dielectric, because Jones already does.

Rejection of Claim 17 under 35 U.S.C. §103) via WO 00/57446 to Jones et al.

The Applicant argues that Jones and Tran fail to teach 1 to 15 “mole weight percent” indium doping of a dielectric. Additionally, the Applicant argues that Jones teaches away from 1 to 15 “mole weight percent” indium doping of a dielectric. As these arguments were presented above, the Examiner refers Applicant to the above applicable responses. Finally, the Examiner notes that Tran need not teach 1 to 15 “mole weight percent” indium doping of a dielectric, because Jones already does.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David L. Hogans whose telephone number is (571) 272-1691. The examiner can normally be reached on M-F (7:30-4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2813

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DH

DA



JACK CHEN
PRIMARY EXAMINER